REMARKS

A. Status of the Claims

The preamble to claim 1 has been amended to amplify the fact that the invention, as claimed, is directed to a method of producing a template for oxygen precipitation in a semiconductor wafer. Support for this amendment can be found, for example, at page 7, lines 13-20 of the specification. Claim 2 has been amended to amplify that epitaxial deposition is performed on the wafer in the same housing as the method of producing the template for oxygen precipitation. Support for this claim can be found, for example, at page 14, lines 15-16 and 19-23 and at page 16, lines 25-28 of the specification.

Claims 1-17 are pending after entry of this Amendment. Examiner's attention is drawn to the Detailed Action section of the above-identified Office action, wherein the claims 18-20 are included in the rejection of claims 1-15 although claims 18-20 are no longer pending. Because it is believed that the reference to claims 18-20 is in error, this Amendment is directed solely to claims 1-17.

Claims 1-15 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Falster et al.(PCT 38675) or Huber et al., both in view of Aswad (WO 99/03138). Claims 16 and 17 have also been rejected under 35 U.S.C. §103(a) as being unpatentable over Falster et al. or Huber et al., both in view of Aswad.

B. Rejection Pursuant to 35 U.S.C. 103(a)

Reconsideration is requested of the rejection of claims 1-17 as being unpatentable over Falster et al. or Huber et al., both in view of Aswad.

Claim 1 is directed to a method of producing a template for oxygen precipitation in a semiconductor wafer, which comprises, among other steps, heating the wafer on a support in a housing to a temperature of at least about 1175°C; moving the wafer out of heat transfer relation with the support with a Bernoulli wand; and cooling the wafer on the wand in the housing at a rate of at least 10°C/sec until the wafer reaches a temperature of less than about 850°C.

While Falster and Huber et al. disclose heating wafers to temperatures of at least 1175 °C and even rapidly cooling them, neither reference discloses nor suggests the means of heating and cooling the wafer as described in claim 1. Specifically, neither discloses rapidly cooling the wafer at a rate of at least 10°C/sec until the wafer reaches a temperature of less than about 850°C while the wafer is within the housing and held on a Bernoulli wand out of heat transfer relation with the support.

Aswad discloses a process and apparatus for decreasing the time required to cool a heat treated wafer to a temperature compatible with most wafer cassettes, *e.g.* to below 100 °C or even to below 60 °C wherein the wafer is removed from the heat treatment process chamber and placed in a separate cooling chamber.[1] Aswad fails to teach or suggest rapidly cooling the wafer at a rate of at least 10°C/sec until the wafer reaches a temperature of less than about 850°C and certainly fails to teach or suggest doing so while the wafer is within the heat treatment process chamber and held on a Bernoulli wand out of heat transfer relation with the support. In fact, Aswad requires that the wafer be removed from the heat treatment process chamber in order to rapidly cool the wafer and as such teaches away from the process of claim 1. Thus, Aswad fails to cure the deficiencies of either Falster et al. or Huber et al.

Applicants submit that none of the cited references, alone or in combination, disclose or suggest rapidly cooling the wafer at a rate of at least 10°C/sec until the wafer reaches a temperature of less than about 850°C while the wafer is within the housing and out of heat transfer relation with the support. Thus, claim 1 is patentable over Falster et al. or Huber et al., either in view of Aswad because the combined disclosure of all three references lacks key elements of the invention described in claim 1.

Claims 2-17 further comprise an epitaxial deposition step as part of the rapid thermal annealing step described in claim 1. The epitaxial deposition and rapid thermal annealing occur in the same apparatus and without an intermediate cool down between these operations. Claims 2-17 depend directly or indirectly from claim 1; therefore, claims 2-17 are patentable over the cited references for the same reasons as claim 1.

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[1]Specifically, Aswad teaches the use of a Bernoulli wand to remove the wafer from the process chamber and to place the wafer onto a cooling station outside the chamber housing, whereupon cooling gas is directed onto the top and bottom surfaces of the wafer prior to further handling. Aswad, at page 6, lines 18-22 and Abstract.

CONCLUSION

Favorable consideration and early allowance of all pending claims is requested. A check in the amount of $400.00 is enclosed for a two month extension of time. The Commissioner is hereby authorized to charge any deficiency or overpayment of the required fee to Deposit Account No. 19-1345.

Respectfully submitted,

Thomas F. Maloney

Thomas F. Maloney, Reg. No. 50,156
SENNIGER, POWERS, LEAVITT & ROEDEL
One Metropolitan Square, 16th Floor
St. Louis, Missouri 63102
(314) 231-5400

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VERSION WITH MARKINGS SHOWING CHANGES MADE

IN THE CLAIMS:

Claim 1 was amended as follows:

1. (twice amended) A method of producing a **template for oxygen precipitation** **[denuded zone]** in a semiconductor wafer in a housing having a source of heat, a susceptor, a wafer support and a Bernoulli wand, said method including:

heating a semiconductor wafer with opposite major surfaces in **the** **[a]** housing to an elevated temperature of at least about 1175°C with a heat source, said semiconductor being supported by **the** **[a]** support in the housing during said heating;

ceasing said heating and moving said semiconductor out of conductive heat transfer relation with the support with the Bernoulli wand; and

cooling said heated wafer in the housing while holding said wafer out of conductive heat transfer relationship with the support at a rate of at least 10°C/sec until the wafer reaches a temperature of less than about 850°C thereby forming a template for oxygen precipitation in the wafer.

Claim 2 was amended as follows:

2. (twice amended) A method as set forth in claim 1 wherein the process additionally comprises the step of placing the wafer in **the housing** **[a chamber]** and applying an epitaxial coating to at least one said major surface thereof before said heating step with said wafer being in immediate heat transfer relation with the support during at least a portion of the coating application.